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INCOSE
INTERNATIONAL COUNCIL ON SYSTEMS ENGINEERING

INSIGHT

Spring 7 996
Issue 11

What's"IN"for INCOSE for **1996?**

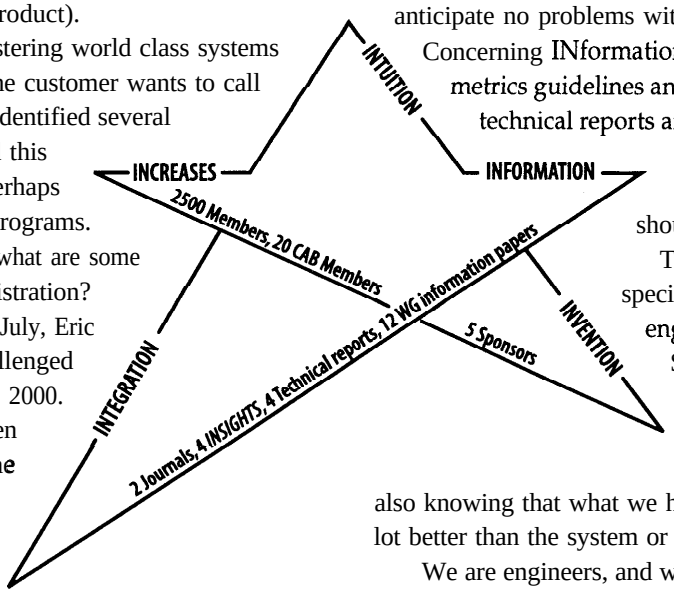
Ginny Lentz, President, lentzg@lfs.loral.com

As the fifth president of the organization, and the first President of the International Council on Systems Engineering, I have captured the "I" and the "N" to focus my goals for the organization for 1996. What I want are INcreases in membership, INfrastructure & INformation (product).

We remain committed to fostering world class systems engineering by whatever name the customer wants to call it. The recent Winter Workshop identified several publications that will be released this year to share with others, and perhaps trigger research or educational programs.

So what's IN for 1996? And what are some quantifiable goals for this administration?

Let's look at INcreases. Last July, Eric Honour, the President-Elect, challenged us to 10,000 members by the year 2000. After a meteoric start we had been plugging along at about 1500. The steps we took with the administrative support have paid off. Renewal rates and membership are up. We broke 2000 before the end of 1995. During the recent Winter Workshop we initiated an update to the strategic plan that will carry us to the year 2001.



With those new members, the INfrastructure has to keep pace. We need to expand the existing chapter base. The chapter presidents do so much work for the organization, as do the focal points for emerging chapters. Among this group are one international chapter, and the Australian Affiliate.

Another part of our INfrastructure is the Corporate Advisory Board, with Texas Instruments, Inc. as the most recent member. We have 19 CAB Members. Most likely, because of an upcoming merger, we will be down one by the middle of April, 1996, so I have set the goal at a reasonable 20. Also, we revised the sponsorship categories, with the hope that we can sign up five more sponsors this year.

Another focus area is INformation. After a very successful first issue of the Journal in 1994, there will be nothing further until the joint issue of the journal with IEEE this year. I would like to have a second issue in '96. That means we need to produce the articles. Speaking of articles, with the Communication Committee's focus on this newsletter, INSIGHT, I anticipate no problems with four more stupendous issues. Concerning INformation from the working groups, the metrics guidelines and Capability Assessment Model technical reports are excellent. With 25+ working groups, achieving 12 additional information papers should be a piece of cake!

This brings me to INtuition, that special trait that sets good systems engineers apart from the crowd. Systems Engineers have the INtuition to know when INvention, is required, and how risky the INvention is. INtuition is also knowing that what we have is good enough and a whole lot better than the system or information in the field today.

We are engineers, and we want to write great stuff. Be we are the leaders — the chosen few — the core competency of INCOSE, those who are just realizing the need for systems engineering. Someone needs to understand the treasure trove

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Inside This Issue

INCOSE Membership Year to Change

Lew Lee, Membership Chair, lewlee@svl.trw.com

In 1996, INCOSE will be making the transition from individual membership anniversary dates to a single membership year that begins on June 1 and ends May 31. Membership rates remain at $60 US per year for members and $10 US per year for student members,

We chose June 1 as the anniversary date because it coordinates membership renewal with the annual symposia nominally convened in July or early August. Many of the members already take advantage of the opportunity to renew their memberships when submitting their symposia registrations. Similarly, many new members tend to join INCOSE during the symposia. Most importantly, there will be significant savings in time and effort expended in getting members to renew their membership — the INCOSE Central Office and the local chapters will greatly appreciate these savings.

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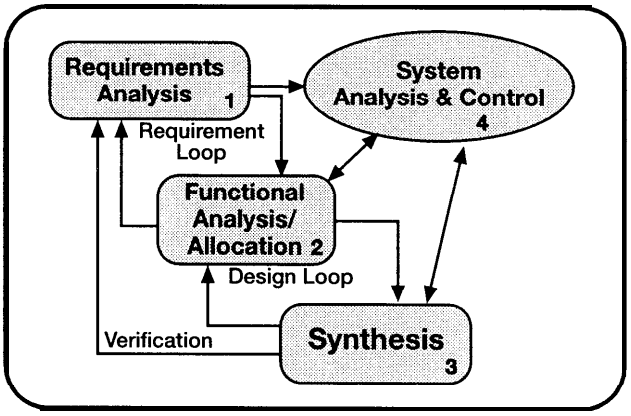

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President's Corner

Ginny Lentz, lentzg@lfs.loral.com

The Winter Workshop in Melbourne, Florida, was very productive for the Technical Board and the administrative committees. Many, many thanks to the Space Coast and Central Florida chapters for hosting the event. The best news is we have defined Systems Engineering for use by the organization (see page 4) — many bouquets to Sten Dahlberg. However, others are expanding the use of the word "design" to cover the same concepts. The Board of Directors and Executive Committee had the highlight of a strategic planning session and other good meetings, but there were a couple disappointments.

Some of you know that James Martin accomplished his goal of returning to Texas. Even though James felt he could still serve the folks in Region IV and had company support to do so, James has resigned as Region IV Director to eliminate any perception regarding less than the best support to the folks in Region IV. Nancy Rundlet, the alternate candidate, was confirmed by the BOD as the Region IV Director from Industry for '96 and '97. James continues to support the organization as a key architect of the strategic plan.

The other disappointment was Jim Lacy's resignation as Treasurer. Following the workshop in Melbourne, the BOD approached Mike Wood, the alternate candidate for Treasurer. He agreed to serve and the BOD confirmed his appointment as Treasurer for '96 and '97. Mike was formerly the Chair of the Ways and Means Committee and worked through the change to our new by-laws.

The combination of Lew Lee and Ken Kepchar is dynamic and will prove only the best for the Membership and Chapter Committees.

Art Morrison, the new Chairman of Ways and Means, continues the good work of coordinating the INCOSE policies and practices. Pat Hale and Valerie Gundrum pick up where Bill Schoening and Sarah Sheard left off as chairs of the Communication Committee without any noticeable change in energy or effectiveness. Bill moved to the Technical Board and Sarah will be my special assistant.

Texas Instruments, Inc. joined the Corporate Advisory Board, so we are back to 19 members as we were at the beginning of '95.

Shirley Bishop, Inc. continues to receive great reviews from the membership for improvements in the Central Office.

The leaders of INCOSE are a great bunch of people to work with — come and join us!

What's "IN": *continued from page 1*

of knowledge available if: (1) they only had what we have either forgotten, or (2) they don't think any more because it is so institutionalized in the way we go about our day.

I hesitate to bring a business perspective but, we need to get product to the market. There is now more competition with societies and associations than in 1991.

And that brings me to INtegration: We are reality, this organization is formed. Over the last 12 months I have started to see some factions develop, with some "what have you done for me," questions. In team terminology, we have entered the storming stage. We will not get through this stage in 1-2 years unless we are really lucky. But we need to recognize that we are in it and institute small corrections and steer this ship, thus my focus on the strategic plan.

All of us are INCOSE. Let the leadership know what you need and we will try to get it for you so that together, we can all foster the practice of world class systems engineering.

INCOSE Membership: *continued from page 1*

The Transition Plan

CURRENT MEMBERS. When renewing your membership in 1996, you will be asked to remit the amount indicated in a membership renewal notice that will be sent to you prior to the mailing of this year's symposium brochure. The fee will be pro-rated to bring your current membership date in alignment with June 1, 1997. FOR THE 1996 SYMPOSIUM ONLY, renewing members choosing to remit their membership fees with the symposium registration will need to refer to the amount indicated in the membership renewal notice. Please note this amount on the symposium registration form. You are encouraged to contact INCOSE if you lose your notice or need assistance.

NEW MEMBERS. Members joining in March, April and May of 1996 will remit $75 in membership fees. Student members will remit $10. These memberships will be good to May 31, 1997. New members who include the $60 membership fee with their 1996 symposium registration, will receive 12 months of membership benefits beginning June 1, 1996. New members joining after August 31, 1996 will need to contact the INCOSE Central Office to obtain a membership application and remit a prorated fee. The INCOSE Central Office is there to help facilitate this transition. Feel free to contact the office.

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Seattle, WA 98121
Email: incose@halcyon.com
206-441-1164 or 800-366-1164

WORKING GROUPS

Technical Community Winter Workshop Highlights

Brian McCay, Chair, bmccay@mitre.org

Technical Community members met in force at the Winter Workshop. Activities included a technical plenary session; status presentations to the Corporate Advisory Board (CAB); meetings by Working and Interest Groups (WG and IG), Technical Committees (TC) and the Technical Board (TB); and full participation and priorities briefings at the Board of Directors (BOD) meetings. The Technical Community met all of their challenges, exceeding expectations. Some highlights follow:

1. *INCOSE definition of Systems Engineering.* Congratulations to Sten Dahlberg, his entire WG, the TB members, and the BOD who tirelessly did the right thing for the community. The definition is: **Systems engineering is an interdisciplinary approach and means to enable the realization of successful systems.**
2. *Transformation of the Emerging Applications TC to the Systems Engineering Applications TC.* Extraordinary efforts by Beth Clark, Bob Coyne, Bill Mackey, Bill Schoening, et al. (See this TC's charter on page 10 for details.)
3. *CAB Priority Needs Briefings.* Well organized, well presented, pointed, and informative presentations that were well-received by the CAB. Great representation for all the fine work being performed in these areas by Rick Harwell (Program Management Guidelines), Jim Schier (Integrated SE Environment), Bill Schoening (Examples of SE Management Process), and John Velman (Roles in Training and Education).
4. *Participation in ISO SE Process standard effort by Jerry Lake.* Jerry will represent INCOSE in an official capacity on the U. S. team. This marks INCOSE's first official technical participation at the international level.
5. *Develop a single SE Capability* Model. Blake Andrews and Rich Widmann will represent INCOSE on the EIA ANSI standards team to develop a single SE capability model. This marks yet another milestone in INCOSE influencing the direction of SE practices worldwide. This is a great capstone to the efforts of the Compliance Assessment WG.
6. *Technical Community Plena y Session.* Three priorities were presented at the plenary, and to the BOD: (1) publication of Technical Community products, (2) initiation of an international outreach program, and (3) establishment of formal relationships with sister SE organizations. Actions towards achieving these goals were taken by BOD and TB members. Results of these efforts will be reported here and at the '96 Symposium.

In summary, the Technical Community continues to make great progress in providing value back to members, their companies, and society. The formation of the SE Applications Technical Committee marks the beginning of formal recognition of the many applications of SE across multiple commercial business areas. INCOSE positions regarding national and international standards, with formal support to their creation signals the arrival of INCOSE's commitment and importance to SE worldwide. Although we have far to go, clearly the train has pulled out of the station. Have your tickets ready to be stamped, it's going to be an action-packed ride with no final destination in sight. All aboard!

Forming Applications Working Groups Within INCOSE

Bill Schoening, m138022@SL1001.mdc.com

INCOSE is seeking to establish Working Groups and Interest Groups for specific applications such as telecommunications, transportation, health care, commercial aircraft, and environmental restoration, as well as subsets of DoD.

At the 1995 Winter Workshop, the Emerging Applications Technical Committee was renamed the Systems Engineering Applications Technical Committee (SEATC). Along with the name change there is a significant redirection in the charter. The SEATC is charged with facilitating the formation and operation of the application- specific WGs and IGs. Already there are two IGs: Facilities (Bill Henderson, chair) and Resource Management (Fred Martin, chair).

In addition, the SEATC has two WGs looking across applications: the Applications Forum (Bill Mackey, chair, and Carolyn Buford, co-chair) and the Business Domain Analysis (Beth Clark, chair). The Applications Forum, formerly the Emerging Applications WG, is continuing with virtually the same charter. In addition, it is the spawning ground for applications not quite ready to be IGs or WGs. The Business Domain Analysis WG is defining the business drivers for specific applications and translating them into SE requirements for use by other WGs.

The WGs and IGs within the SEATC are matrixed with the IGs and WGs in the other five technical com-

mittees: Measurement, SE Processes and Methods, SE Management, Modeling and Tools, and Education and Training. The application-specific WGs will examine the integration and use of these specialties within the application. Each application-specific IG and WG will provide some limited support to the Applications Forum and Business Domain Analysis WGs for their INCOSE products. (WGs have defined products and schedules for completing those products.)

If you are interested in forming an application-specific IG or WG, contact Bill Schoening by email. If you have interest in a specific application, but are not quite ready to be an IG or WG, contact Bill Mackey at wmackey@cscgt.gsfc.nasa.gov or Carolyn Buford at cbuford@pop500.gsfc.nasa.gov.

Commercial SE Working Group Changes Name, Focus

Beth Clark, eaclark@uswest.com

We can all sense that the world is changing and that change seems to come faster and faster. INCOSE has been concerned that systems engineering is not keeping pace. Exploring different application domains provides an understanding of how systems engineering needs to adapt in a rapidly changing world. As part of INCOSE's renewed emphasis on systems engineering applications, the Commercial SE Working Group became the Business Domain Analysis Working Group (BDAWG) at the Winter Workshop. The BDAWG is defining business drivers for specific applications and translating them into requirements for use by other INCOSE Working Groups. The goal of the BDAWG is to understand how systems engineering process fits into the enterprise and creates value for the customer. If you are interested in participating in the Business Domain Analysis Working Group, contact Beth Clark at (303) 592-6451 or eaclark@uswest.com.

Applications Forum Working Group

William Mackey, wmackey@cscgt.gsfc.nasa.gov

The Applications Forum Working Group (AFWG) is part of the Systems Engineering Applications Technical Committee and is chartered to *facilitate* the *introduction and use of systems engineering principles, techniques, and practices to application domains in Government, private industry, and academia. The* AFWG is application focused, does not exclude any SE application, and is intended to provide INCOSE a forum to exchange successful practices that result in high-quality goods and services at affordable and appropriate cost.

The AFWG initially met at the INCOSE Winter Workshop during January as the Emerging Applications Working Group, and after much stimulating discussion, decided to change its name. The term "emerging" seemed to create more confusion and consternation than ever intended, and detracted from the positive goals and activities which are gaining attention throughout the INCOSE community.

The initial product of the AFWG is the Systems Engineering Applications Profiles which is intended to be released in its third draft by March 1996. This document presently contains 14 industry sectors and is expected to expand to 26. For each industry sector (or application area), the industry functions and processes, technology profiles, systems engineering challenges, contacts and references are included.

The AFWG goals for 1995-96 are being achieved. Each goal, and the corresponding status, is as follows:

1. Establish a charter for the working group. The charter was established and approved by the WG on 7/25/95; the charter was revised due to the name change at the Winter Workshop on 1/24/96.
2. Complete and release the second draft of the Applications White Paper. The second draft was approved for release by the WG on 7/26/95. The third draft is well underway.
3. Identify other AFWG work products. Additional products and expected dates for release include:
   - Systems Engineering Applications Profiles, 3/1/96
   - Applications Profiles Writers Guide, 4/1/96
   - Case Studies of Systems Engineering Applications, 12/1/96
4. Conduct two to four systems engineering applications sessions at the symposium in Boston, MA, July 7-10, 1996, on diverse systems engineering applications. The response for diversity has been great! Marty Ross, GTE, Tech Chair is creating multiple sessions in SE Applications.
5. Conduct two additional systems engineering applications at the same symposium in topic areas such as highway transportation, telecommunications, and natural resource management. This goal will cause this symposium to be different in that we will be able to assemble application areas with focused interest as an experiment. Members of the WG seeded the symposium with quality papers in applications areas and Marty Ross has created specific SE Applications sessions in Transportation and Environmental Restoration. A Telecommunications session is also being examined as a possibility.
6. Initiate contact with universities that offer as systems engineering curriculum to gain their participation in

the AFWG. As an example, the Washington Metropolitan Area Chapter has had presentations from the SE staff of Virginia Tech and some members have provided research assistance with SE students at George Mason University.

7. Stimulate INCOSE interest groups in local chapters. This goal is becoming very exciting and will be the subject of future communication. Four local chapters have accepted the challenge and have active focused programs. They are:

   - Chesapeake: Telecommunications (C. Buford)
   - Washington Metro: Highway Transportation Systems and/or Criminal Justice and Legal Systems (W. Mackey)
   - San Francisco Bay Area: Natural Resource Management Systems (Ted Dolton and Fred Martin) We hope to showcase some of this work at WG sessions in Boston, MA.
   - Detroit/Tri-State: Motor Vehicle Systems (Bob Ottoline)
   - Texas Gulf Coast: Energy Systems (no volunteer yet).
   - New England: Health Care Systems (no volunteer yet).

The AFWG welcomes your participation in maturing the SE Applications Profiles document and in participation at the local chapter level. Anyone interested in rolling up the sleeves and supporting the goals and interests of the AFWG can contact one of the following people:

William Mackey, wmackey@cscgt,gsfc.nasa.gov
Carolyn Buford, carolyn.buford@cscgt.gsfc.nasa.gov
Ted Dolton, dolton_ted@mmac.is.lmsc.lockheed.com
Pat Mackin, pmackin@swri.edu

Requirements Working Group

Beth Simon, b_simon@tolstoy.mdc.com

The Requirements Working Group met at the Winter Workshop to continue working on current projects. These are:

1. Define for managers the monetary value of the Requirements Management task. This will be accomplished by soliciting data from industry. At the workshop, Ivy Hooks, Beth Simon and Jeff Cyr generated the survey form, and received commitment from two organizations to participate in our pilot study. Jonette Stecklein provided comments on the form.
2. Generate a paper on requirement tool interfaces. This is a follow-on to last year's paper on requirements for requirements tools. David Jones and Pradip Kar continued the work on this paper at the workshop.
3. Create a requirements reference library on the Internet. The Internet site has been established, and the library is partially created.
4. Create a trifold for potential new members describing the RWG. Michelle Bailey has created a draft.
5. Also, we have a paper entitled "Characteristics of a Good Requirement," created by two RWG members, which we are considering for publication as a working group paper for this year's symposium.

Thanks to all of the RWG Winter Workshop participants for a productive meeting.

Systems Engineering Management Methods Working Group

Rich Harwell, Chair, rharwell@mindspring.com;
James Martin, Co-chair, jmartin@airmail.net

We made significant progress at the Winter Workshop! As promised at the July Symposium, we reexamined our charter and updated it. Since our first election of officer's was held March of '95, a new election was conducted and the current slate was returned. However, beginning at this year's symposium, we will hold annual elections to ensure full working group participation.

Most importantly, in keeping with the INCOSE Technical Board objectives of concentrating on meaningful product development, we identified and scheduled activities and responsibilities for the following products:

1. Generation of Program Management Guidelines for applying SE on a program, and development of qualitative data that demonstrates cost, schedule, and quality benefits of applying SE or regrets of not applying SE, including:
   - single page brochure identifying SE applications guidelines for program managers (July '96)
   - Single-page Executive Summary of Applications Guidelines (July '96)
   - Case studies/structured analyses of program successes benefiting from SE, or programs failures which could have been lessened by application of **SE**
2. New member brochure/web home page (Feb '96)
3. SEM Guidance Handbook — targeted for SE leaders implementing SEM on new projects or in support of new product teams (draft — Dec. '96, final -July '97)

Education and Training Technical Committee

John Velman, Chair, velman@ccgate.hac.com
Joe Spigai, Cochair, jspigai@umuc.umd.edu

At the '96 Winter Workshop the Education at Training Technical Committee (ETTC) approved a position statement concerning academic degree programs in Systems Engineering. This is now ready for circulation and comment by the Technical Board. A key element of the statement is the encouragement of introductory systems engineering for all engineering undergraduates, but does not encourage an undergraduate major in systems engineering. Several projects of the ETTC's two working groups were reviewed. One of these is a description of tasks done by a typical engineer as part of a systems engineered project. This was originally a product of the Professional Development Working Group. After review by the Academic Development Working Group (and some modification) this has been submitted to the Technical Board for comment and discussion. This document and a companion skill inventory have been written with a view to providing guidance to those developing either academic curricula or on the job training.

In addition to these work products, the ETTC undertook to maintain and improve reference material on the INCOSE WWW site. The information about available SE education and training will be expanded to include commercial SE offerings, and a list of companies offering in-house SE training in addition to the list of universities offering SE programs.

Several other things are in work. We will try to keep you informed about other developments as the year progresses.

Professional Development Working Group

Dick Phillips, dwp@sei.cmu.edu

The Professional Development Working Group (PDWG) came to the '96 Winter Workshop with draft material for two work products that will be useful to anyone involved in Systems Engineering education or training. The first of these is a description of the tasks that engineers do to support application of systems engineering of a product. (Notice that this is phrased so as to avoid the question "who is a system engineer?") A second major product under development is a Reference Model of Systems Engineering designed specifically to aid the preparation of educational and training resources. These work products have undergone joint review with the Academic Development Working Group, and are now being coordinated with other interested working groups and committees. One last item developed by the PDWG as part of this effort will become a significant reference source in its own right. This item is a bibliography of papers relating to systems engineering education. It will be included soon in the INCOSE WWW site.

Academic Development Working Group

Joe Spigai, jspigai@nova.umuc.edu

The Winter Workshop was a busy one for the Academic Development Working Group (ADWG). Thanks to the sparkplug efforts of Brian Mar and the cooperation and work products of the Professional Development Working Group, a lot was accomplished, including:

1. A statement concerning the INCOSE position on academic degrees which is ready for circulation to the Technical Board. The statement re-affirms the need for a basic overview course in SE to be taken by all engineering undergraduates. It does not encourage an undergraduate major in SE.

2. The details of the SE overview course recommended above, including its goals, objectives and principal subjects areas was developed (thanks to the efforts of Brian Mar) and will be forwarded to the Technical Board.

3. A key work product that resulted from the meeting was the development of a full-blown seven course SE certificate program, with complete descriptions of the course material. After review and comment by the Technical Board, the ADWG plans to publish this as the model certificate course.

4. Thanks to the efforts of the PDWG, a typical profile of what system engineers do, and their knowledge and skill bases is presently under development.

5. The key continuing action item for the ADWG is to add to the INCOSE Web home page, on a continuing basis, the following items:
   - A list of schools, colleges and universities offering systems engineering degrees and certificate programs. Also included will be a listing of commercial companies offering SE training.
   - A continually expanding Bibiography of Systems Engineering.

INCOSE members with ideas on these, and other academic areas, are asked to send them to my email address above, or phone me at 301-985-7200.

Principles Working Group

Bill McCumber, mccumber@lfs.loral.com

The Working Group on Principles of Systems Engineering met during the INCOSE Winter Workshop. Anticipated near-term products are 1) a summary paper for Volume 2 of the Proceedings of the 1996 International Symposium on Systems Engineering, and 2) a (possible) special issue of the INCOSE Journal on Systems Engineering devoted to first principles, to be published in 1997. The basis for the special issue will be a revised "Pragmatic Principles" paper and the two-part paper "The Dimensions of the Systems Engineering Environment," by Roland Frerking, et al. now in peer review. The remaining pages of a special issue will be populated by distillation of inputs solicited from the INCOSE membership-at-large and from invited papers. Members are asked (see below) to provide the Principles Working Group with first principles they have relied upon in their experience, citing the original source, if known.

A working meeting was held March 12-14 in Washington, DC at which the Volume 2 article was finalized and inputs received from the membership were analyzed. Members wishing to contribute candidate principles are invited to send their suggestions to Sten Dahlberg at dahlbergs@net.a1.boeing, who will accumulate the inputs and prepare a data base that will then be analyzed (looking for the intersect space) by the Principles Working Group. The group thanks the membership-at-large in advance for their participation.

Providing a complimentary copy of ***INSIGHT*** to potential members is a great way to introduce them to your chapter and the organization.
For extra copies, contact the Central Office:

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Technical Committees and Working Groups

INCOSE TECHNICAL BOARD

Chair:
Brian McCay, 617-271-5727, bmccay@mitre.org

Technical Committee Members:
Education and Training Technical Committee: John Velman
Systems *Engineering Applications Technical Committee:* Bill Schoening
Measurement Technical Committee: Rich Widmann
Modeling and Tools Technical Committee: Mark Sampson
Systems *Engineering Management Technical Committee:* George Vlay
Systems Engineering Processes and Methods Technical Committee: Dorothy McKinney

Board **of Director Representatives:**
Jerry Lake, 703-751-7987, lakejg@planetcom.com
Rich Mintz, 206-394-4820, rmintz@scitor.com

INCOSE Technical Community as of February 1996

INCOSE TECHNICAL COMMITTEES AND CHAIRS

Education and Training Technical Committee
Create, coordinate, and disseminate the means to develop system engineers through undergraduate, graduate, focused, and on-the-job training. (John Velman, 310-364-6202, jrvelman@ ccgate.hac.corn; Joe Spigai, 301-985-7200, jspigai@nova.umuc.edu)

Academic Development Working Group
Define and develop methods and requirements necessary to educate system engineers in formal academic environments, and, in so doing, develop the system engineering academic models and standards that can be used as a guide for existing and developing formal academic programs at all levels. (Joe Spigai, 301-985-7200, jspigai@nova.umuc.edu)

Professional Development Interest Group
Explore methods and requirements to train for systems engineering in a professional environment. (Dick Phillips, 412-268-5877, dwp@sei.cmu.edu)

Systems Engineering Applications Technical Committee
Facilitate the formation and operation of working and interest groups whose purpose is to examine systems engineering within specific application domains and across domains. (Bill Schoening, 314-234-9651, m138022@SL1001.mdc.com)

Business Domain Analysis Working Group
Define business drivers and their relationships to their sectors. Translate this understanding into requirements for systems engineering and the priority of these requirements to internal INCOSE Working Groups. (Beth Clark, 303-541-8287, eaclark@uswest.com; Bob Coyne, 206-487-7452, bcoyne@atl.com)

Application Forum Working Group
Facilitate the introduction and use of systems engineering principles, techniques, and practices to application domains in industry, government, and academia. (Bill Mackey, 301-794-2049, wmackey@cscgt.gsfc.nasa.gov; Carolyn Buford, 301-794-2060, cbuford@cscgt.gsfc.nasa,gov)

Facilities Systems Engineering Interest Group
Provide a forum to address the application of systems engineering within the facilities environment and articulate the value of systems engineering in terms of cost and time savings through achieving continuous improvement. (Bill Henderson, 615-454-5295, hendersonwf@hap.arnold.af.mil)

Measurement Technical Committee
Create, coordinate, and disseminate methods to measure systems engineering, including best examples of those measurements. (Rich Widmann, 310-616-7685, 0069222@msgate.emis.hac.com; Bill Miller, 201-386-5339, william.d.miller@att.com)

Benchmarking Working Group
Encourage and assist member organizations to participate in benchmarking and to use the results to improve the overall maturity of INCOSE systems engineering practices. (Jerry Fisher, 703-841-8824, gfisher@hq.caci.com; Jack Fisher, 818-225-8710, seajnf@aol.com)

Besf Practices Working Group
Collect and report on successful and innovative systems engineering practices. (Bruce Pittman, 408-354-3680, bpittman@scuacc. scu. edu)

Capability Assessment Working Group
Lead a broad-based INCOSE initiative to develop a method for assessing and improving the efficiency and effectiveness of systems engineering. (Blake Andrews, 319-395-4922, sys_baa %afds@hobbes.cca.rockwell.com; Bill Mackey, 301-794-2049, wmackey@cscgt.gsfc.nasa.gov; Mary Simpson, (509) 375-4539, mj_simpson@pnl.gov)

Metrics Working Group
Promote shared understanding of systems engineering metrics and measurement practices, and advance the state-of-the-art of metrics collection and utilization. (Donna Rhodes, 607-751-6102, dhrhodes@lfs.loral.com; Bill Miller, 201-386-5339, william.d.miller @att.com; Ann Wilbur, 408-473-6719, awilbur@synopsys.com)

Modeling and **Tools Technical Committee**
Advance the state of the practice of systems engineering through the use of COTS tools and models. (Mark Sampson, 214-669-9937, sampson@slate.tdtech.com)

Information Model & Process Interest Group
Develop and disseminate executable representations of the systems engineering process, including schemes for tools integration. (Dave Oliver, 518-399-0860, dwoliver@ix.netcom.com; Rick Steiner, 714-732-8312, steiner@igate1.hac.com)

Model Driven System Design Working Group
Characterize model driven system design and identify transition strategies from present document driven approaches. (Loyd Baker, 205-837-5922, Byron Purves, 205-461-3413, Larry Permenter, 804-825-8533)

Tools Database Working Group
Deliver a tools comparison/information database for general COTS systems engineering tools. (Bill McMullen, 214-575-7578, w-mcmullen@ti.com; Randy Case, 214-205-5306, rcase@esy.com)

Tools *Integration & Interoperability Working Group*
Foster productivity and quality of systems engineering through integrated tools and environments. (Jim Schier, 703-631-2000, JSShier@tasg.com; John Nallon, 214-669-9937, nallon@ slate.tdtech.com)

Systems Engineering Management Technical Committee
Create, coordinate, and disseminate engineering management methods that apply to the definition, development, and support of

systems. (George Vlay, 415-941-1530, 07g21b49@svpal.org; Rick Harwell, 770-740-0907, rharwell@mindspring.com)

Requirements Working Group
To create a source for the best methodology for defining, communicating, and managing requirements. (Beth Simon, 314-232-7359, simon@intega.mdc.com; Ivy Hooks, 713-486-7817, ihooks@hti.net; Don York, 201-386-6386, donald.m.york@att.com)

Risk Management Working Group
Identify risk management tools and methods, process description, planning activities, literature sharing, best practices, lessons learned, and interfaces with related functions. (Larry Brekka, 703-824-3302, lbrekka@lan.mcl.bdm.com)

Standards and Handbooks Working Group
Provide a focal point within INCOSE for: collecting and disseminating information on public and private sectors systems engineering related standards and handbooks; formulating, coordinating, and forwarding INCOSE positions and comments to originators of new/revised public and private sectors systems engineering related standards and handbooks; preparing and/or reviewing and making endorsement recommendations on standards and handbooks on the definition, understanding, and practice of World Class Systems Engineering. (Richard Schwadron, 314-232-6392, m169012@ws1951.mdc.com; Randy Zittel, 703-805-3465, zittelr@dsmc.dsm.mil)

Systems Engineering Management Methodology Working Group
Create, coordinate, and disseminate process definitions and methods for planning, organizing, integrating, and controlling the technical aspects of a project throughout a system's life cycle. (Rick Harwell, 404-740-0907,rharwell@mindspring.com; James Martin, 201-386-4485, jmartin@airmail.net)

Test and Evaluation Working Group
Promote all aspects of test and evaluation from a systems engineering perspective. (Don Greenlee, 619-546-6508, don_greenlee@cpqm.saic.com)

Systems Engineering Processes and Methods Technical Committee
Create, coordinate, and disseminate technical processes and methods used in the definition, development, and support of systems. (Dorothy McKinney, 301-640-3021, dmckinney@lfs.loral.corn; Dick Wray, 216-796-9931, rwray@ldsa.com)

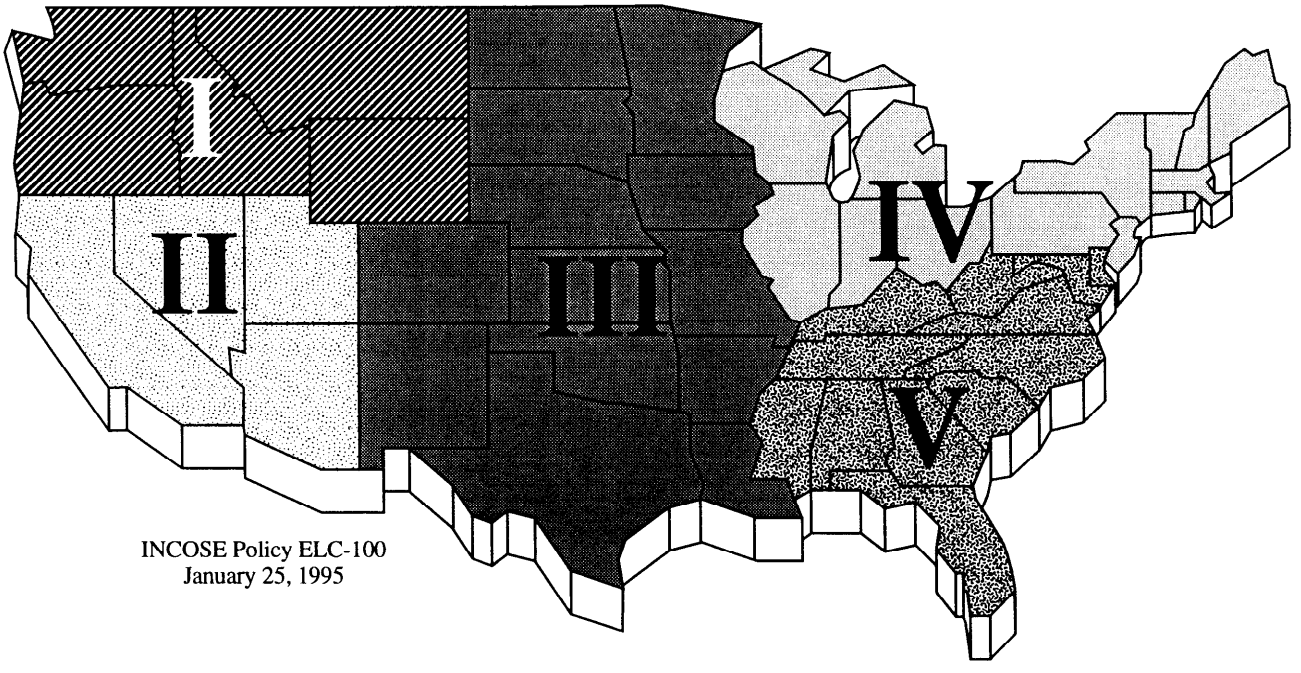
Principles Working Group
Investigate the logical principles underlying top level system design and provide guidance in establishing boundaries, interfaces, and top-level system transfer functions. (Bill McCumber, '301-493-1443, mccumber@aol.com)

SE Process Working Group
Refine a description of systems engineering elements and their interactions that is useful to practicing system engineers and requirements for benchmarks, methods and techniques for implementing the systems engineering process. (Bob Olson, 619-927-1653, bob_olson@imdgw.chinalake.navy.mil; Dick Wray, 216-796-9931, rwray@ldsa.com; John Snoderly, 703-805-5258, snoderlyj@dsmc.dsm.mil)

Sys *terns Architecture Working Group*
Determine processes, methods, and enabling technologies to develop practical systems architectures that will satisfy user needs. (Kent A. Johnson, 703-404-9769, k.johnson@ieee.org; Chander Ramchandani, 301-794-2439, cramchandani@cscgt.gsfc.nasa.gov; Timothy B. Smith, 214-205-4209, SMITHTB@aol.com; Bill Gess, 714-732-2712, wgessjr@msmail2.hac.com)

Terminology Working Group
Create and disseminate standard definitions for key terms related to the practice of systems engineering. (Sten Dahlberg, 206-657-1676, dahlbergs@net.al.boeing.com)

INCOSE U.S. Regions



INCOSE Policy ELC-100
January 25, 1995

LOCAL CHAPTER NEWS

local Chapter Affairs

Ken Kepchar, Chair, kkepchar@gwsmtp01.mdc.com

The 1996 Winter Workshop in Melbourne Beach, Florida provided an excellent opportunity for all Local Chapter Presidents and representatives to gather and exchange ideas. This year we combined our meeting with Lew Lee's Membership Committee because of the number of topics of common interest. The involvement was tremendous. Everyone left the meeting with many good ideas to bring back to their local chapters.

Approximately 20 people attended, representing 15 of our local chapters. The topics covered included:

- Single date membership proposal by Lew Lee
- Feedback session (very spirited) with Ginny Lentz
- Policy statement update from Ways & Means Committee
- Membership retention analysis by Lew Lee
- Education committee activities by Joe Spigai
- Running tutorials at the chapter level by Lew Lee
- Review of new chapter kit by Nancy Rundlet and Jonette Stecklein
- Critique of chapter activities by all present

New Chapters: Congratulations to our newest INCOSE Chapters and their presidents!

Silver State (Los Vegas)	John Clouet
Snake River (Idaho)	Norm Cole

INCOSE now has 23 active Local Chapters plus our affliated society in Australia. A number of groups are actively forming chapters around the world. Our growth over the first five years has been tremendous, and I expect that this expansion will continue unabated over the next five years. If anyone is interested on receiving the minutes from the Melbourne meeting, or information on chapter activity in your area, check out the Local Chapter page on the INCOSE Web site, or contact Ken Kepchar by e-mail, phone (314) 234-8156, or FAX (314) 233-0303.

Central Arizona Chapter

Madeleine Engstrom, Acting President, EngstrM@tmpmp104.allied.com

The Central Arizona Chapter held its first meeting of the year in March, 1996. The meeting featured Mr. Jim Brill of the INCOSE Central Office. Monthly meetings are planned for April, May and June, so if you did not receive an invitation to the March meeting, please, contact Ms. Madeleine Engstrom of Allied Signal in Tempe (602-496-7811). Madeleine is acting as president. She is working hard to get the chapter up and running in a format that everyone wants and will support. Your support is necessary. Please, contact Madeleine with your ideas.

Southern Arizona Chapter

H.S. Goodkin, President, hsgoodkin@ccgate.hac.com

The fall of '95 and winter of '96 was a busy time for members of the chapter. We facilitated the development of a student chapter, planned for a tutorial, and held local meetings.

Meetings are held monthly with good participation from the local systems engineering community. The format is dinner, followed by a discussion of local events, followed by a technical presentation. Featured technical presentations have included Dr. Terry Bahill on "Discovering System Requirements," Ms. Ivy Hooks on "Writing and Managing System Requirements", Dr. William Hoehn on "Six Sigma Manufacturing," and Doug Burke on "Design for Manufacturability & Assembly (DFMA) ." The meeting in March has scheduled Dr. Jerry Lake and Mr. Jim Brill featuring their usually fine job on "World Class Systems Engineering."

Meetings are planned each month through June. Come out and join us. Your support is necessary, and your ideas are welcomed.

Mr. Dave Owens is working hard to develop local support in the Sierra Vista - Fort Huachuca, Arizona area. The first meeting in Sierra Vista was scheduled for March, and more will follow. For more information, please, contact Dave at owensd@primenet.com or telephone 520-452-8844. The systems engineering work being performed at the fort in the Sierra Vista area could provide the momentum for a local INCOSE chapter to form.

University of Arizona Student Chapter

Brian Carson, President, carson@bigdog.engr.arizona.edu

Congratulations are in order for the University of Arizona Student Chapter, which was recognized by the Central Office BODs at the '96 Winter business meeting. Mr. Brian Carson is president and Mr. Anthony Ronghi is vice president. Both men have done an outstanding job at putting together the first full-fledged student chapter of INCOSE. Should other chapters desire information on how to set up a student chapter, please, contact Brian or Anthony at (520) 298-8035 or via email at carson@bigdog.engr.arizona.edu.

The students, in addition to their own events on campus, send a representative to the Southern Arizona local chapter meeting each month The local chapter sends a "real systems engineer," if you believe that, to the student meetings whenever possible. This helps to promote a strong relationship between the two chapters, and it is working out to be a great relationship.

North Texas Chapter

Randy Case, President, rcase@esy.com

On Tuesday, February 6, 1996, the North Texas Chapter had their first local chapter meeting of 1996. After spending some time talking about the Winter Workshop, including comments by Region III Director, Dorothy Kuhn, we launched into a discussion of "What is a Commercial System Engineering Process."

Mr. Steve Steinheimer presented his view of the transition from DoD-centric process to a commercial-centric process based on his twelve years as a DoD SE, and his current ten months in the commercial world. The main idea that Steve discussed was "how much alike the commercial world is to the DoD world in terms of SE process." However, some of the specifics must shift to conform with the new environment:

- shorter development cycles, typically 3 to 6 months
- requirements must be "discovered" by the design team
- develop prototype after prototype after prototype, with a requirement/design/develop/test/verify loop for each prototype
- document for success, not stress
- everything is developed to "fixed cost" and "design to cost" rules

While most of the above may not be much of a surprise, I think that Steve's approach to documentation needs some additional comments. Although Steve claims that he still "over documents," he maintains a single, "living" document for the life of a project. This document starts out as the goals/problems/needs of the project. Requirements are added as they are discovered, followed by the design detail to a level needed for the developers, users, and customers as to what will be done and how it will work. Finally, the "as built" user/administrator guide flavor is written, and is left with the customer. Great approach!

A tentative schedule of chapter events is as follows:

- April 3, Election results and an additional topic
- June 6, Paper review for INCOSE Symposium
- September 10, Topic is TBD
- November 6, Tool Show

Washington Metropolitan Area

Sarah Sheard, Programs Chair, sheard@software.org

The WMA chapter started its new year with new officers, including Jim Long, VP and president elect; Abe Meilich, secretary; Cathy Tilton, treasurer; and Bill Oran, director. Continuing are Art Pyster as president and Jim Armstrong as director.

Although our January meeting was cancelled because of the "Blizzard of '96," we are ready for the new year, with renewed energy, a great set of programs, and some new ideas. We will be buying dinner for first-time attendees now, and will be encouraging new members to fill out an information sheet so that we can introduce them in the chapter newsletter. We are looking for a chapter Web site server, to be donated by the employer of one of our members, and a chapter email reflector. Our chapter programs for the next quarter include several of the most highly rated programs in our membership survey last year, such as "Achieving SEI CMM Level 4" and "Business Process Reengineering," we will an attempt to branch into new fields such as telecommunication, by asking Randy Ade to describe "Systems Engineering at Bell Atlantic." We hope to double the average attendance at our chapter meetings, and increase the breadth of our membership in 1996.

New England Chapter Report

Pat Hale, halep@engl.otis.utc.com

The December meeting of the New England chapter was hosted by Draper Laboratory, and provided a welcome break from marathon shopping. The program was a presentation and live demonstration of autonomous robotic technology by Dr. David Kang, who leads an enthusiastic group of MIT students and Draper staff in developing robots for space, undersea and terrestrial missions. The products of this team are impressive and very inexpensive in DoD terms. Dr. Kang and several members of his student team provided a technical presentation on the challenges of pushing the envelope in autonomy, and a thorough analysis of the large number of potential applications for smart robots, followed by a demonstration of a terrestrial robot with acoustic, inertial and laser sensors. The enthusiasm of the team was infectious, and all in attendance probably added an item to their Christmas wish lists.

The next New England chapter meeting will be held March 19th at Papparazzi's restaurant in Bedford, MA. Our speaker will be RADM Millard Firebaugh, USN (Ret.), who recently served as Chief Engineer at the Naval Sea Systems Command; Admiral Firebaugh will address his experiences and strategic insight into the role of systems engineering in Navy ship and weapons system development programs.

The weather and preparations for the 1996 Symposium have kept the membership busy with shovels and logistics during January and February, but we all are readying our tanning butter for July!

SF Bay Area Chapter Grows!

Jim Whalen, President, jim_whalen@smtp.svl.trw.com

The SF Bay Area Chapter greeted the 1996 new year with a record increase in membership growth. We began 1995 with 140 members, and ended the year with over 200. Our success is due to the tremendous support of our membership, and continuing interest in taking advantage of the membership benefits we offer. More than fifty people attend our monthly programs.

In December, we had a joint meeting with the Society for Computer Simulation. The talk was on "The Role of Computer Simulation in Winning the America's Cup," given by Mr. Dave Egan of Silicon Graphics. He spoke of his reinvention of the yacht design process for the 1995 America's Cup winning entry with Team New Zealand.

"Fundamentals for the Engineering of Complex Systems," a one-day tutorial was held in December. The duo of Dr. Brian Mar

(University of Washington) and Mr. Bernard Morais (Synergistic Applications) had an attentive audience of thirty-six people.

In January, Dr. Robert Leachman presented "Decision Techniques for Project Managers." The turnout was tremendous. Seventy-seven people attended, which is an all time high for the SF Bay Area Chapter. The demand has been great to borrow copies of the videotapes of this presentation.

February's talk was given by Mark Sampson of TD Technologies, who spoke on "SLATE", a CAE groupware for systems engineers and architects. Mark's talk contained a lot of technical information, and was structured to give the audience a comprehensive summary of the product, its capabilities, and philosophy. Mark's presentation set a new standard for product demonstrations, evidenced by the brisk pace of requests for this videotape.

On March 29 and 30, Ivy Hooks (Compliance Automation, Inc) will offer two sessions of "Writing Good Requirements." Enrollment will be limited to forty people for each day

Finally, the chapter's balloting was completed in December. Our officers are: Jim Whalen (President), Sue Shreve (Vice President), Dave Preklas (Secretary) and Al Reichner (Treasurer).

Silver State Chapter Hosts Mini-Conference!

Kevin Harbert, kevin_harbert@notes.ymp.gov

The Silver State Chapter will host a two-day Region II mini-conference April 26 -27, 1996. The mini-conference is planned to be held at the University of Nevada, Las Vegas (UNLV), the home of the "Runnin' Rebels" basketball team. The Silver State Chapter will also host the INCOSE Winter Workshop for 1997 in sunny Las Vegas, NV, fun capital of the world.

An open meeting for the Silver State Chapter was held February 28, 1996, at the UNLV Thomas Bean Engineering Complex. The guest speaker was L. Dale Foust, TRW Assistant General Manager, Nevada Site for the Management and Operating Contractor on the Yucca Mountain Site Characterization Project. The topic of his speech was "Evolution of Systems Engineering."

For further information about Silver State Chapter events, contact Kevin Harbert, SAIC, at (702) 794-7637 or by email.

INCOSE Local Chapters and Contacts

Region	Chapter Name	City, State or Country	Contact	Email	Phone	Fax
I	Snake River	Idaho Falls, ID	Norman Cole	ncole@inel.gov	208-526-5004	208-526-8287
	Seattle Metro	Seattle, WA	Bob Coyne	coyne@sai.com	206-557-1738	206-557-1779
	Tri-Cities	Richland, WA	Tom Woods	twwoods@aol.com	509-375-4539	509--375-6417
II	Southern Arizona	Tucson, AZ	Harry Goodkin	hsgoodkin@ccgate.hac.com	520-663-6751	
	Inland Empire	San Bernadino, CA	Chuck Kondrack	chuck.kondrack@trw.com	909-383-3887	909-383-3846
	Los Angeles Area	Los Angeles, CA Orange County Ventura	Susan Jones	susan.jones@aero.org.	310-336-8576	310-336-5581
	San Diego	San Diego, CA	Ernesto Amaro	emesto_amaro@qmail.laguna.sparta.com		
	San Francisco Bay Area	San Jose, CA	Jim Whalen	jim_whalen@smtp.svl.trw.com	408-743-6121	408-743-6114
	Silver State	Las Vegas, NV	John Clouet	john_clouet@notes.ymp.gov	702-295-9144	702-794-7445
	Central Arizona*	Phoenix, AZ	Jack Sivak	jacksivak@aol.com	602-585-6849	602-585-7726
	Salt Lake Valley*	Utah	Harlan Reed	reed_harlandQout.trw.com	801-774-2750	801-774-7930
III	Metro Denver	Denver, CO	Beth Clark	eaclark@uswest.com	303-541-8287	
	North Star	Minneapolis, MN	Dave Walden	david.d.walden@cdev.com	612-921-6469	612-921-6869
	Midwest Gateway	St. Louis, MO	Ken Kepchar	kkepchar@gwsmtp01.mdc.com gkkep@inlink.com	314-234-8156	314-233-0303

* Emerging Chapters

INCOSE Local Chapters and Contacts

Region	Chapter Name	City, State or Country	Contact	Email	Phone	Fax
III (continued)	North Texas	Dallas / Ft. Worth, TX	Randall Case	rcase@esy.com randy_case@nkn.net	214-205-5306	214-205-4689
	Texas Gulf Coast	Houston, TX	Jonette Stecklein	jsteckle@ssf2.jsc.nasa.gov	713-244-7146	713-244-8108
	San Antonio*	San Antonio, TX	Heidi Beason	beasonh@diamond.brook.af.mil	210-536-4598	210-536-4535
	Iowa	Cedar Rapids,IA	Blake Andrews	baandrews@crems.rockwell.com sys baa%afds@hobbes.cca.rockwell.com	319-395-4922	319-395-4064
IV	New England	Boston, MA	Pat Hale	halep@eng1.otis.utc.com pat_hale@msn.com	860-676-5250	860-676-6850
	Tri-State	Detroit, MI	Dan McClure	Inustruk.gzjhbr@gmeds.com dmcclure@msmail3.hac.com	810-375-5307	810-375-2346
	Liberty	Rockaway, NJ	John Niles	jniles@oica.army.mil	201-724-7586	
	Hartford*	Hartford, CN	Bhal Tulpule	tupule@hsd.utc.com	203-654-9218	203-654-9203
	Illinois"	Illinois	Dave Sea ton	seaton@tellabs.com	708-512-7935	708-512-7098
	New York State*	New York	Darryl Mounts	d.mount@ieee.org	716-726-4168	716-726-2851
	NE Ohio"	Ohio	Bob Bodi	bobbodi@aol.com	216-228-0545	216-228-6729
	Day ton*	Dayton, OH	Edward Pohl, PhD	epohl@afit.af.mil	513-255-6565	513-476-7621
	Delaware Valley*	Pennsylvania	Richard Pariseau	pariseau@nadc.navy.mil	215-441-3342	215-441-2562
V	Huntsville	Huntsville, AL	William Boggs	william.boggs@msd_hsv1.hv.boeing.com	205-461-3177	205-721-1943
	Washington Metro	Wash, D.C.	Art Pyster	pyster@software.org	703-742-8877	703-742-7200
	Space Coast	Melbourne, FL	Sam Harbaugh	harbaugh@acusys.com		
	Central Florida	Orlando, FL	Tom Remenick	tom_remenick@ccmail.orl.mmc	407-826-1777	407-826-1581
	Chesapeake	Baltimore, MD	Mark Walker	Imwalker@tasc.com Imwalker@sun.aitc.rest.tasc.com	410-850-0070 X2057	410-850-0404
	Atlanta*	Atlanta, GA	Dan Garvin	garvind@aol.com dclown@aol.com	404-818-8658	404-818-8100
	North Carolina*	Raleigh, NC	Kip Klish	klish@aurxce.aur.alcatel.com	919-850-5114	919-850-5588
	Tennessee*	Tennessee	John Waddell	waddell@orvb.saic.com	423-481-2164	423-481-8590
	Southern Virginia*	Virginia	Wolt Fabrycky	fabrycky@vtvml.cc.vt.edu	703-231-6147	
INTERNATIONAL	Vancouver*	Vancouver, Canada	Jas Madhur	jwm@mda.ca	604-231-3086	604-278-5625
	Montreal*	Montreal, Canada	Michel Lavigne	miavigne@oerlikon.ca	514-358-2000	514-358-1744
	Toronto*	Toronto, Canada	Saeid, Habibi, PhD		416-798-6868	416-798-6840
	UK	United Kingdom	Derek Hitchins	100752.1433@compuserve.com	441793785225	441934-626544
	Holland	Schiphol, Netherlands	Cheryl Atkinson		31-20-605-3725	3120 605-4940
	Scandanavia*	Norway	Odd Andeas Asbjornsen Asbjornsen	oaaite@termo-unit.no	47 73 59 37 20	
	Australia'*	Australia	Herve Rochecouste	rochecou@spf15m.jorn.gov.au	613-541-6901	613-543-3338

* Emerging Chapters
** Affiliation

CALENDAR OF EVENTS

March

12 – Washington Metropolitan Area chapter meeting
Topic: Systems Engineering at Bell Atlantic, Randy Ade
Time / Place: Tuesday, 6:30 PM, Boeing Information Services, Tycon Tower, Level A Conference Room, 8000 Towers Crescent Drive, Tysons Comer, Vienna, VA
Contact: Reservations are appreciated; please call (703) 913-1505

12 – SF Bay Area Chapter Monthly Meeting
Topic: Questioning the Basics: Making System Engineering Work in the Real World
Speaker: R. Bruce Pittman, Profit Engineering Technologies
Time / Place: 5:30 to 7 PM., GTE Government Systems, Mtn View
Contact: Lew Lee, (408) 743-4299, x5090, lew@svl.trw.com

28, 29 – SF Bay Area Chapter Tutorial
Tutorial: Writing Good Requirements
Presenter: Ivy Hooks, Compliance Automation, Inc.
This is a one-day tutorial. To receive course information and enrollment form, contact Lew Lee, (408) 743-4299, x5090
lew@svl.trw.com

University of Arizona Student Chapter
Meetings are held on the first and third Monday of the month in the Old Engineering Building at 5:30pm. Contact Brian Carson or Anthony Ronhgi, carson@bigdog.engr.arizona.edu, (520) 298-8035.

April

9 – Washington Metropolitan Area chapter meeting
Topic: Achieving SEI CMM Level 4, Speaker TBD
Time / Place: Tuesday, 6:30 PM, Boeing Information Services, Tycon Tower, Level A Conference Room, 8000 Towers Crescent Drive, Tysons Comer, Vienna, VA
Contact: Reservations are appreciated; please call (703) 913-1505

9 – SF Bay Area Chapter Monthly Meeting
Topic: Analytic Hierarchical Process
Speaker: James T. Whalen, TRW SIG Sunnyvale
Time / Place: 5:30 to 7 PM. TBD location.
Contact: Lew Lee, (408) 743-4299, x 5090, lew@svl.trw.com

11 – Southern Arizona Chapter
Topic: Dinner and a technical presentation
Contact: Harry Goodkin, hsgoodkin@ccgate.hac.com, (520) 663-6751.

No date - Central Arizona Chapter meeting
Topic: Dinner and technical presentation
Contact: Madeleine Engskom, EngstrM@tmpmp104.allied.com, (602) 496-7811.

University of Arizona Student Chapter
Meetings are held on the first and third Monday of the month in the Old Engineering Building at 5:30pm. Contact Brian Carson or Anthony Ronhgi, carson@bigdog.engr.arizona.edu, (520) 298-8035.

26, 27 – INCOSE Region II Conference
Place: University of Nevada, Las Vegas
Contact: Kevin Harbert, kevin_harbert@notes.ymp.gov, (702) 794-7637

May

14 – Washington Metropolitan Area chapter meeting
Topic: Business Process Reengineering, Elliot Chikofsky
Time / Place: Tuesday, 6:30 PM, Boeing Information Services, Tycon Tower, Level A Conference Room, 8000 Towers Crescent Drive, Tysons Comer, Vienna, VA
Contact: Reservations are appreciated; please call (703) 913-1505

14 – SF Bay Area Chapter Monthly Meeting
Topic: Building Models for Performance Analysis
Speakers: Bill Haskett and Vic Dagragnano, SES, Inc.
Time / Place: 5:30 to 7 PM. GTE Government Systems, Mtn. View
Contact: Lew Lee, (408) 743-4299, x5090, lew@svl.trw.com

14 – Southern Arizona Chapter meeting
Topic: Dinner, technical presentation, nomination of officers.
Contact: Harry Goodkin, hsgoodkin@ccgate.hac.com, (520) 663-6751.

No date: Central Arizona Chapter meeting
Topic: Dinner, technical presentation
Contact: Madeleine Engskom, EngstrM@tmpmp104.allied.com, (602) 496-7811.

University of Arizona Student Chapter
Meetings are held on the first and third Monday of the month in the Old Engineering Building at 5:30pm. Contact Brian Carson or Anthony Ronhgi, carson@bigdog.engr.arizona.edu, (520) 298-8035.

June

11 – Washington Metropolitan Area chapter meeting
Topic: Symposium Preview, local members present papers that will be given at the symposium
Time / Place: 6:30 PM. Boeing Information Services, Tycon Tower, Level A Conference Room, 8000 Towers Crescent Drive, Tysons Comer, Vienna, VA
Cost: $8 for light dinner and soft drinks
Contact: Reservations are appreciated; please call (703) 913-1505
Sarah Sheard, sheard@software.org

11 – SF Bay Area Chapter Monthly Meeting
Topic: TBD
Contact: Lew Lee, (408) 743-4299, x5090, lew@svl.trw.com

12 – Southern Arizona Chapter meeting
Topic: Dinner, technical presentation, installation of new officers
Contact: Harry Goodkin, hsgoodkin@ccgate.hac.com, (520) 663-6751.

No date: Central Arizona Chapter meeting
Topic: Dinner and a technical presentation
Contact: Madeleine Engskom, EngstrM@tmpmp104.allied.com, (602) 496-7811.

University of Arizona Student Chapter
Meetings are held on the first and third Monday of the month in the Old Engineering Building at 5:30pm. Contact Brian Carson or Anthony Ronhgi, carson@bigdog.engr.arizona.edu, (520) 298-8035.

People On The Move

John Ammirati has joined Lynx Real-Time Systems as their Manager of Core Product Development working on the "hard" real-time, deterministic, POSIX-standard operating system (LynxOS) and an accompanying software development environment (PosixWorks). John can be reached at jla@lynx.com.

Kevin Brune has accepted a position with Motorola, Inc., as a Senior Engineer developing CAD Systems and software engineering solutions. Kevin can be reached at RP5362@email.mot.com.

Bob Coyne is working for Siemens Medical Systems, Ultrasound Group, as a Project Engineer / Project Manager. Bob's position entails a mixture of writing schedules and specifications, and managing resources. Contact Bob at coyne@sqi.com.

Kerinia Cusick and **Ilene Minnich,** both formerly of Hughes, have started their own company. SECAT LLC (Systems Engineering Capability Assessments & Training) was formed to provide training and consulting services on the Systems Engineering Capability Maturity Model (SE-CMM) and its associated appraisal method. They can be reached at secat@secat.com

Fred Knopf is now working for Vitech Corporation in Vienna, VA., as the Director of Marketing and Sales for the CORE product line. His duties also include the related training and consulting services. You can reach Fred at fknopf@vtcorp.com.

James Martin has moved to work for Texas Instruments in Plano, Texas. He will be working on satellite communications systems and products. His responsibilities include technical marketing, architecture definition, requirements management, and whatever else needs to get done. Since James grew up in Texas, this is a move back to a more familiar clime. He can now be reached at jmartin@airmail.net.

Tom Palmer works for Loral Space and Range (soon to be Lockheed Martin) as the Director of RSA Integration and Activation. Contact Tom at tpalmer@rsa.hisd.harris.com.

Ken Porter is now working for Loral Federal Systems in Orlando, FL. His position involves research and development of Army simulation command and control cognitive models (making virtual commanders). Contact Ken at kporter@greatwall.cctt.com.

Alex V. Rubin is currently working for Applied Materials in Santa Clara, CA, in the Systems Integration of Wafer Chemical Mechanical Polishing System. You can reach Alex at rubin_alex@amat.com.

Richard Vaughn has accepted a position with Lockheed-Martin Missile and Space Co. as a Staff Engineer in the Systems Engineering group. You can contact him at richard_vaughn@fmc.com.

Dave Walden, recently elected President of the INCOSE North Star Chapter, is now the Systems Engineering Process Leader for Technology Development at Computing Devices International in Bloomington, Minnesota. He is responsible for leading the definition and deployment of processes within the Technology Development process area. His contact information remains David.D.Walden@cdev.com.

INCOSE Online

Internet Networking for INCOSE Working Groups, Boards, and Committees

Sarah A. Sheard, sheard@software.org, with help from Lew Lee, lew@svl.trw.com

By now, it is fairly evident that most people either have email or will get it soon. Your first job in your committee will be to assess who has email and who will need to deal with snail mail and faxes. Hopefully everyone will be on line.

Now, telecon agendas and minutes are simple! Collect a list of all your working group members, distribute it to everyone, and if everyone makes up an email distribution list containing all the names, email is very simple.

The hard part is in-work documents. For example, documents created in Word, Word Perfect, Powerpoint, or Excel cannot always be sent easily over the internet. The reason is, the Internet protocol assumes the eighth bit of a byte is a parity bit, and those programs do not. The result is, things like the above documents must be encoded in one scheme or another before being attached to email, sent over the internet, then decoded back to a file to be opened with the usual software.

There are dozens of encoding schemes. BinHex, MIME, and UUENCODE are popular ones, and the newer mail handling software and servers tend to automatically encode and decode such schemes. America OnLine uses some other scheme that is ONLY good for encoding and sending from one AOL user to another. If your email program has a service called "Attach Document," like CCMAIL and EUDORA do, it is encoding the document automatically. Sometimes the encoding scheme can be chosen by a switch on the email, and sometimes it is hidden to the user. You can call your system administrator to find out if you like. If someone else also has automatic coding and decoding and sends you a document, if you are really lucky, it will just pop onto your hard disk in a readable, format that you can manipulate.

However, usually you are not so lucky. Sometimes all people can send is one kind of encoding, and not everyone can read that. What is the solution?

First, let's get real. Not everyone wants to play around with coding and decoding schemes. "Attach document" is about as complicated as many people want to get. These are the same people who will have trouble switching documents between two of their own email accounts, so asking everyone to get an AOL account, for example, does not serve them any better. They will have to download a document at home onto their home computer, put it onto a floppy, take it into work, read it onto their spreadsheet or word processor, and...oh, what's the use. Just fax me the durn thing.

Now, we want to make things easier to review and make changes on than happens with fax, so ideally we would be able to come up with a scheme to make things easy to transport from person to person. The Communication Committee (Comm2) has in fact been asked to come up with a way, and has come to the conclusion that right now, things are too fluid. People are getting improved intemet mail systems every day, and any complicated "never fail" processes we draw up now will be obsolete before we communicate them to everyone. What does all this boil down to? In the ideal intemet world, which is imminent, you have the following scenarios:

1. Have your email software encode / decode
2. Have your email gateway encode / decode
3. Do it yourself on your personal computer
4. Use text only and make it part of the message
5. Use the fax
6. Mail diskettes (Mac users can use File Exchange or System 7.5 to read PC-diskettes, PC users can use shareware Mac-ette or one of the commercial software packages to read Mac files)

Of course, the goal is to get everyone to scenario 1. But until then...

The answer is to make use of the fact that this is an organization of engineers. There has got to be one Internet-savvy person on each working group, committee or board. Generally these people enjoy broadening their Internet skills, realizing that the ability to communicate on the intemet is the key to career marketability in this century and the next. So use these people!

So, until everyone hooked up into the ideal scenario, anoint a Most High Techno-Guru from each working group, committee, or board. Ask this person to stock up on encoding and decoding programs, and assess with test documents which kind works with each person on the committee. Then use the Most High Techno-Guru as a distribution point for documents, "Let's see, Jim and Walter get UUENCODE, Shiela, Cary, and Tom get MIME, Bill and Joe get Binhex. And I have to save documents as text and incorporate them into email messages for Jeanne and Wesley." Once the Most High Techno-Guru gets this process down, your committee is up and running. Then everytime the email system is

upgraded to be more transparent for any one of you, the MHT-G can drop you off his or her "problems" list. In a year or two, probably everyone will be able to transparently contact everyone else, and the MHT-G will be out of a job and a cool title.

INCOSE-Wide Email Distribution

Beth Clark, eaclark@uswest.com

INCOSE now has an electronic mailing list. To send and receive messages, INCOSE members must first subscribe by sending the following message to:

incose-list-request@xor.com

with ONLY the following text in the BODY of your message:

subscribe incose your<emailaddress> <your name>

To send a message to other INCOSE members who have subscribed, send e-mail to:

incose-list@xor.com

To remove yourself from the mailing list send an e-mail to:

incose-list-request@xor.com

with the following command in the body of your email message:

unsubscribe incose your <email address>

The INCOSE mailing list is devoted to the announcements of INCOSE and systems engineering related meetings, workshops, publications, and for communication of INCOSE business to the entire membership. Overtly commercial advertisements are not permitted. Subscribers should expect to see such announcements on occasion, and submittals should be limited to the specifics of dates, places, technical content, and contact points for additional information. Additionally, this mailing list may serve as a forum for discussion of questions, issues, lessons learned, best practices, research topics, and sources of additional information on systems engineering.

New Space Coast Chapter Web Page

Sam Harbaugh, harbaugh@acusys.com

All INCOSE members are welcome to check out the Space Coast Chapter Web Page at www.fit.edu/~incose.

Washington Metro Area Chapter Web Site

Sarah A. Sheard, sheard@software.org

The WMA Chapter now has a web page, if you are interested in monitoring their activities! Check them out at http://www.vtcorp.com/wma-incose/

INCOSE Obtains own Internet Domain Name

Beth Clark, eaclark@uswest.com

INCOSE has applied for and obtained its own Internet domain name. In Internet-speak, a domain is a unique address that identifies a computer or network which is connected to the Internet. An Internet domain name is a vital component of an organization's identity. You will always be able to find INCOSE's World Wide Web (WWW) site at http://www.incose.org.

INCOSE Changes Internet Service Providers

Beth Clark, eaclark@uswest.com

Many thanks to U S WEST for hosting INCOSE's World Wide Web site for the last year or so. INCOSE has contracted with a commercial provider, XOR Network Engineering, to run our Web Site. At our new location, INCOSE member Mark Ottenberg will continue to be the Webmaster. In addition, INCOSE is continuing its contract with Mark's company, New Horizons Press, for home page design services.

Please change your bookmarks! The site at U S WEST will be going away soon.

CAB on the Web

Many of the companies on INCOSE's Corporate Advisory Board (CAB) Web sites. The Communications Committee is in the process of providing links to these sites from our INCOSE Web Site. To access CAB company web sites directly, check out these URLs:

http://www.northrop.com/
http://www.mitre.org/
http://www.prc.com/
http://www.gtefsd.com/
http://www.hughes.com/
http://www.alliedsignal.com/
http://www.honeywell.com/
http://www.boeing.com/
http://www.raytheon.com/
http://pat.mdc.com/
http://www.motorola.com/
http://www.trw.com/
http://www.rockwell.com/
http://www.aero.org/
http://www.lockheed.com/
http://www.battelle.org/
http://www.pnl.gov:2080/

Industry Briefs

INCOSE Representative to ISO/IEC JTC1/SC7

Jerry Lake, lakejg@prime.planetcom.com

Jerry Lake has been commissioned by the INCOSE Board of Directors to serve as the INCOSE representative on the United States Team within Working Group 7 of the ISO/IEC JTC1/SC7. The Joint Technical Committee 1 (JTC1) (Information Technology) of the International Organization for standardization (ISO) and the International Electrotechnical Commission (IEC) is considering development of an International Standard on System Life Cycle Processes. This standard is prompted by the fact that systems are becoming increasingly dependent on software for functionality. However, strained by their inherent differences, hardware engineering and software engineering have been evolving separately. Moreover, for lack of an integrating force at the system level, several specialty areas of systems engineering seem to be standardizing in a localized manner. Hence, the JTC1's proposed goal is to define a top-level architecture of the life cycle of a system containing hardware (including computers), software, and personnel. The life cycle would span from the conceptualization of needs through acquisition, supply, development, production, operation, and maintenance of systems to their disposal.

The next international meeting is to be held in Prague in late May. Jerry will keep the membership informed of the progress and direction of this international effort in future issues of INSIGHT and as otherwise directed by the Board of Directors. Help will be sought from INCOSE working groups as appropriate to provide inputs to the standard and reviews of draft sections. It is estimated that full development of such a standard will take at least five years.

INCOSE members from our international chapters are encouraged to contact their national IS0 standard teams to volunteer participation or otherwise become involved to make an INCOSE international presence felt in forming this standard. Descriptions or summaries of efforts in this endeavor should be provided for publication in INSIGHT or sent to Dr. Jerry Lake (lakejg@smisyseng.com) who will include such reports in his update.

NASA History Series Offers a look Behind the Scenes

Contributed by Dona Lee, dlee@stratsight.com

"Exploring the Unknown: Selected Documents in the History of The U.S. Civil Space Program," has just been published through the Government Printing Office in cooperation with the NASA History Office.

The publications tell the story of the U.S. space program through the actual documents which enabled individuals to plan and accomplish the nation's mission of exploring the unknown.

Volume 1, the first of three to be published, is subtitled "Organizing for Exploration." It deals with more than 200 documents, many of which are published for the first time. Each section is forwarded by a headnote which provides context, bibliographical details and background information necessary to understand the documents. The documents are separated into four eras, beginning with a narrative explaining the historical significance of the documents and their place in the timeline of the space program.

Volume II, due out at the end of the year, will deal with NASA's cooperative efforts with other organizations domestically and abroad. In July 1997 the series will be completed with publication of Volume III which will take a detailed look at the Agency's programs and projects.

The first volume is edited by John M. Logsdon, Director of the Center for International Science and Technology Policy and the Space Policy Institute of George Washington University where he is a professor.

Copies of Volume I can be purchased for $43.00 through the NASA Information Center, Code COL-19, NASA Headquarters, Washington, DC 20546, or by calling (202) 358-0000 for more information. The order number is SP-4407.

NASA press releases and other information are available automatically by sending an Internet electronic mail message to domo@hq.nasa.gov. In the body of the message (not the subject line) users should type the words "subscribe press-release" (no quotes). The system will reply with a confirmation via E-mail of each subscription. A second automatic message will include additional information on the service. NASA releases also are available via CompuServe using the command GO NASA.

Systems Engineering Education and Training Research

Jerry Gene Watts, jgwatts@u.washington.edu

A questionnaire is being prepared to support research concerning how companies educate and/or train their systems engineers. The information collected in the questionnaire will allow systems engineering training to be studied in relation to the size and nature of the company, how it trains other engineers, and what attributes and capabilities it considers important for systems engineers to have. The questionnaire is designed to be completed by someone familiar with the company and its training program for engineers.

Systems Engineering Profile Research

Master thesis work in the area of systems engineering profiles within the aerospace industry is being conducted at the University of Washington. The goal of this thesis work is to develop a systems engineering capabilities inventory form and database tool. Upon completion, companies will be able to collect domain and process expertise information on their systems engineering workforce and will be able to manipulate this information to better utilize/train their existing systems engineering workforce.

If you are interested in completing one or both of the questionnaires, or would like to provide additional information that may be helpful in these areas of research, please contact Dr. Brian Mar at (voice) 206-543-7941, (fax) 206-543-1543, or (e-mail) bwmar@u.washington.edu.

International Conference on Software Quality

Mike Mayor, mikem@firstmrk.ott.hookup.net

The ASQC in Conjunction with the IEEE Computer Society will hold the 6th International Conference on Software Quality at the Westin Hotel, Ottawa, October 28 - 30, 1996.

Please avail yourselves of our Web site. The URL is http://wwwsel.iit.nrc.ca/6ICSQ. The page contains the call for papers and will be updated periodically.

Continuing Agronomy Interest in Systems Engineering

Jeff Grady, jgrady@ucsd.edu

INCOSE member, Jeff Grady, was asked to make a brief presentation on systems engineering at the annual meeting of state agricultural agents at University of California, Davis on February 20, 1996. This was a three-day meeting with the first afternoon focused on systems thinking. Dr. Stephen Kaffka of UC Davis gave a talk on general systems theory, followed by Grady on the application of aerospace approaches to agriculture. The final talk of the day was by Dr. Jonnie Johnson who runs IACR-Rothamsted in Hartfordshire, England. For 150 years they have been recording information in great detail on the agricultural use of over 100 acres, which is the longest running experiment in the world. Grady's goal is to introduce a one-day systems engineering tutorial at UC Davis for agriculture that can be presented by members of the local INCOSE chapter in the bay area.

Systems Engineering and Environmental Impact

John Boarder, 100064.1533@compuserve.com

IEE Professional Group M5 (Systems Engineering) is organising a Colloquium for April 24, 1996 with the Title "System Engineering and Environmental Impact: What is More Important, the Customer and his Contract or the User and his Environment?"

The Colloquium is an all day event at Savoy Place in London with the following outline programme; some speakers have confirmed their contribution and the definitive titles of their presentations is awaited:

- Robert Gaitskell QC: M&D Chairman on the M&D role for Engineering, Management and the Environment
- David Ronchetti: Head of Facilities Management CAA Swanwick Centre
- Paul Budgen: Noble Denton Consultants: Environmental Risk Assessment
- Simon Morgan: Engineering Centre for Wales: Engineering Council's Code of Professional Practice for Engineers and Environmental Issues
- Peter Riley: De Montford University: Legal Aspects of Engineering
- John Boarder: Cartref Consulting Systems: System and Environment Concepts

While the title of the Colloquium is broad, one of the main intentions of the event is to capture and hopefully formulate the real issues facing systems engineering and the environment. Recent events in Milford Have and the rail crash at Stafford have important consequences for system engineers, their customers and end-users. It is hoped to draw these issues out and to use them in furthering IEE, M5 and possibly INCOSE activities.

INCOSE Infrastructure

How Can Anything That's low Impact be Good for You?

Lew Lee, Membership Chair, lew@svl.trw.com

It's the start of a new year and if you're like me, you gave up on making and breaking resolutions long ago. In a recent infomercial, I was bombarded with the hype on the benefits of low impact exercise. How could anything low impact be good for you if there's no work involved? In this installment, I'll show you some low impact ideas that are good for you, your chapter and INCOSE.

Patricia Riedinger of the Washington Metro Area Chapter reports her chapter has set five goals: (1) to satisfy expressed member needs; (2) to diversify programs to be more representative of the WMA; (3) to diversify and increase attendance to at least 60 per chapter meeting by December 1996; (4) to create one or more significant technical contributions from the chapter; and (5) to create or improve mechanisms for communication with members and the broader community.

Their goals revolve around the fundamental precepts of any viable organization. Know your customer, give them what they want, and grow stronger in the process. And just who are the customers? The WMA has their membership, the broader community (includes corporations and what I like to refer to as "not yet" members) and INCOSE.

Formulating activities to support these goals will likely start with the chapter's officers, board members, and committees. Your support to your chapter's goals will be key to the success of your chapter. Here are suggested "low impact" contributions you can make:

- Invite a colleague to a chapter meeting. One of the greatest benefits of INCOSE is the potential for networking and developing professional contacts.
- Rebroadcast INCOSE email announcements to colleagues. If your company has a public electronic message posting area or bulletin board. Show your support with "word of mouth advertising." By the way, this is a great way to build up your network of contacts.
- Offer feedback. How was the monthly program? Do you have an idea for a speaker or topic suggestion?
- Offer to distribute flyers and brochures. How about facilitating a display of brochures in the cafeteria or entrance lobby area? Borrow the chapter banner for a month and display it in a public area of the company.

You can play a big role in helping your chapter and INCOSE; it will take very little time on your part. So what are you waiting for? Pick a low impact activity and get moving. (Add a little disco music. And a one . . . and a two . . . stretch . ..)

INCOSE Melbourne Board of Directors Meetings

Joe Defoe, defoej@lfs.loral.com

At the Winter Workshop in Melbourne, Florida, the board of directors, in four meetings lasting eight hours and forty-one minutes, considered fifty-two agenda items. Fifty-five documents, totaling 355 pages, were presented to the board and to the plenary sessions. The BOD meetings produced eighteen action items, three of which were closed during the Winter Workshop. The board considered fifteen formal resolutions. Thirteen were approved and two were tabled.

Among the adopted resolutions of general interest to the membership are:

- INCOSE definition for systems engineering: Systems engineering is an interdisciplinary approach and means to enable the realization of successful systems.
- Dr. Jerry Lake named INCOSE representation to the US IS0 systems standard team (see article on page 21).
- Policy encouraging the formation of student chapters. Details of the process to be determined by the Local Chapters committee.
- Single membership renewal date. Details will be provided by the Local Chapters and Membership committees, and by the central office (see article on page 1).
- Nancy Rundlet named to replace James Martin as region IV director. James Martin, who had moved from region IV, resigned consistent with the tacit understanding within INCOSE that a regional director should reside within the region which they represent.
- Mike Wood named to replace Jim Lacy as treasurer. Jim Lacy resigned as treasurer during the Winter Workshop.
- Eleven INCOSE policies we've updated as recommended by all the committees through their representation on the Ways and Means committee.
- Renewal of the central office contract with Shirley Bishop, Inc.
- The board also conducted a day-long strategic planning retreat. Larry Pohlmann was appointed by president Ginny Lentz to chair a committee that will draft a revised INCOSE strategic plan based up the results (see next article).

Strategic Planning Committee

Lawrence D. Pohlmann, Chair, pohlmann@boeing.com

NCOSE was established in the summer of 1990 and our purpose, goals and objectives were developed. An initial Strategic Plan was drafted that fall.Our leadership at that time agreed that our purpose, goals and objectives and our strategic plan should be reexamined "in about five years" and revised if necessary based on the then-current situation. Those five years have passed.

The recommended reexamination process was initiated at our Winter Workshop in January, 1996. The Board of Directors, along with a few of the current "movers and shakers" of INCOSE, were invited to a one-day retreat. There were three stated goals for the retreat:

1. To begin the strategic planning and thinking process that will result in an updated INCOSE strategic plan.
2. To review, revise, or confirm INCOSE's organizational purpose, goals, and objectives.
3. To define the roles and responsibilities of the Board of Directors, for both planning and current operations, as INCOSE begins its second five years.

We used a number of brainstorming and consensus building methods to look at INCOSE's current environment, issues at hand, strengths and weaknesses, our vision of the future, and potential initiatives to move us toward that vision. The following candidate initiatives were identified:

- Increasing INCOSE technical committee / working group product development
- Increasing the number of members, chapters, corporate sponsors, and sponsors
- Increasing INCOSE external recognition and stature
- Finding ways to facilitate or sponsor SE theory and research and development
- Collecting and developing SE education / training / tutorial materials
- Increasing our SE-related standards participation
- Moving toward a front office staff and executive director
- Continuous improvement of symposia and meetings
- Making alliances with other professional societies

Ginny Lentz, our current President, appointed Larry Pohlmann to lead a Strategic Planning Committee to follow up on the ideas brought out at the retreat. Ginny, James Martin, Jim Brill (Past-President) and Eric Honour (President-Elect) will participate as members of this committee. A number of other INCOSE members have been and will be solicited to develop plans for these and potentially other specific initiatives. Plans and progress will be reported through INSIGHT, through your local chapters, and through our web site.

Corporate Advisory Board

Ken Ptack, Chair, ptack@itd.nrl.navy.mil

The Corporate Advisory Board (CAB) would like to welcome Texas Instruments, Inc. as the 19th member of the CAB!

The CAB met in conjunction with the '96 INCOSE Winter Workshop. Mr. John Grimm, Head of Systems Engineering, represented TI. The CAB members were very pleased with the progress of the Technical and Administrative Committees since the '95 Symposium in July. The administrative committees, technical committees, and working groups made many more advances during the very productive Winter Workshop, including defining the term "systems engineering."

The CAB reviewed and refined the priority initiatives that they would like INCOSE to pursue. The top initiatives include:

- Establishing a single systems engineering assessment model
- Creating products from working group outputs
- Increasing awareness of INCOSE
- Continuing to identify successful commercial efforts

The CAB is looking forward to a successful '96 symposium in Boston. In addition, the CAB is looking forward to many more useful products from the Technical Committee and the all-important working groups.

Corporate Advisory Board Members

The Aerospace Corporation
Allied Signal, Inc.
Ascent Logic Corporation
Batelle-Pacific NW Laboratory
The Boeing Company
GTE Government Systems Company
Honeywell Corporation
Hughes Aircraft Company
Lockheed Martin
Loral Federal Systems
McDonnell Douglas Aerospace
Mitre Corporation
Motorola GSTG
Northrop-Grumman Corporation
PRC
Raytheon Corporation
Rockwell International
Texas Instruments, Inc.
TRW Systems Integration Group

Communications Committee

Valerie Gundrum, valerie@lfs.loral.com

The Communications Committee (Comm2) has had a dynamic year, meeting many of the objectives set at the 1995 Winter Workshop. Our World Wide Web page has been touted in several past issues of this newsletter. Four issues of this newsletter have appeared in your mail last year. The membership directory has been mailed to all the members. These are the things that affect INCOSE members directly. Of course, several initiatives internal to the committee have been accomplished, but I won't bore you with those!

Last year's accomplishments could not have been realized without the tenacious leadership of co-chairs Sarah Sheard and Bill Schoening, who pushed, sweet-talked, cajoled, and delegated to the rest of the committee. (We had lots of fun and laughs, too!) At the 1996 Winter Workshop, the roles of chair and co-chair have been turned over to Pat Hale and Valerie Gundrum, respectively. The other members of Comm2 are: Ellen Barker, Shirley Bishop, Randy Case, Beth Clark, Dona Lee, Lew Lee, Terry Robar, and Jim Sanchez. Sarah and Bill still participate in our bi-monthly telecons, while dovetailing into their new assignments within INCOSE. Please address any concerns, questions, or ideas to any of these people.

Upcoming activities for Comm2 include:

- populating INCOSE's WWW page with products and information from the working groups,
- transitioning production of the newsletter to a professional organization (editing responsibility remains within Comm2),
- participation in efforts to get INCOSE's name and purpose into more external avenues,
- developing a resume book for interested readers.

If you have any information or wish to assist in these endeavors, please contact a Comm2 member you happen to know, or Valerie by email or phone (607-751-2245).

Columnist

The Information ByWay

Jack Fisher, Seajnf@aol.com

Systems engineering principles are best taught or understood with reference to specific examples from the design, development or operation of real systems. A partial list of the books in my library that provide insight into the design, development or operation of a specific system is shown below. I use these books to provide material for my systems engineering classes. Although systems engineering may not be specifically mentioned, reference is made to design practices, trade-offs, risk management techniques, project management approaches, etc., that illustrate good and bad systems engineering practices.

- Karl Sabbagh; Twenty-first-Century *Jet, The Making and Marketing of the Boeing 777.* Scribner, 1996. This book, a companion to the Public Television series, describes the design and development of the Boeing 777 commercial aircraft and provides an insight into the risk management considerations in the design of a twin-engined aircraft to fly overseas routes upon its introduction into service in June 1995.
- C. Irving; *Wide-Body, The Triumph of the 747.* William Morrow, 1993. This work, which documents the development of an earlier generation of Boeing commercial aircraft, provides insight into the interaction of users and developers in the generation of requirements for a new aircraft design.
- I? Stevenson; *The Pentagon Paradox, The Development of the F-18 Hornet.* Naval Institute Press, 1993. A history of aircraft development in the DoD environment that describes the highly political trade-off between a light-weight, highly maneuverable or a heavier, more sophisticated, lower-performance fighter aircraft and how the choice was made by the Navy.
- Michael J. Neufeld; *The Rocket and the Reich, Peenemunde and the Coming of the Ballistic Missile Era.* Free Press, 1995. A history of the V-2 project and a fascinating insight into the role of Werner von Braun and the development of the technology that provided the basis for ballistic missiles and the space age.
- Tracy Kidder; *The Soul of a New Machine.* Little Brown, 1981. This classic articulately conveys the excitement and intense pressures that arose during the schedule-driven design and debugging of the Data General MV/8000 minicomputer. This book may still be available in paperback.
- Anon.; *Aging Nuclear Power Plants: Managing Plant Life and Decommissioning.* Office of Technology Assessment, September 1993. This study of the problems of decommissioning nuclear power plants including waste disposal and site cleanup standards also presents operating metrics and a discussion of aging problems for nine operating plants.
- R. W. Smith; *The Space Telescope, A Study of NASA, Science, Technology, and Politics.* Cambridge University Press, 1993. A scholarly study of the trials and tribulations of the Hubble Space Telescope (HST) project from inception in 1969 to early mission results in 1992 that documents the collision of politics and systems engineering and the costly impact on this endeavor.
- Dennis R. Jenkins; *Space Shuttle, The History of Developing the National Space Transportation Sys fem.* Dennis R. Jenkins, 1993. A privately published history of the Space Shuttle development that includes a comprehensive technical description and considers the development of manned reusable space vehicles from the Eugen Sanger concept of 1929 to the operational Shuttle.
- Stephen L. McFarland; *America's Pursuit of Precision Bombing, 1910-1945.* Smithsonian History of Aviation Series, 1995. The Norden bombsight, developed in the 1930's, was credited with an accuracy that allowed dropping a bomb into "a pickle barrel from 20,000 feet." This book presents a history of the development and use of this very sophisticated (for its day) analog computer and its performance during World War II.
- H. M. Sapolsky; *The Polaris System Development, Bureaucratic and Programmatic Success in Government.* Harvard University Press, 1972. A critical examination of the success of the Polaris Fleet Ballistic Missile Program. The managerial innovations introduced by this program include PERT, Reliability Management Index, the program management center, and weekly program review meetings. The author claims that the primary value of these innovations was to give the Project Office an "unprecedented organizational autonomy" that protected it against the "bureaucratic interference of comptrollers and auditors."
- Francis Duncan: *Rickover and the Nuclear Navy, The Discipline of Technology.* Naval Institute Press, 1990. An overview of the Naval Nuclear Propulsion Program and the role of Admiral Rickover in trade-

offs between a conventional and a nuclear-powered fleet. The Rickover philosophy included prolonged testing of equipment and systems, opposition to automation in safety-related systems, resistance to design changes for a working system and an insistence upon simple and reliable designs.

- C. G. Brooks, J. M. Grimwood, L. S. Swenson, Jr.; *Chariots for Apollo, A Histo y of Manned Lunar Spacecraft.* NASA History Series SP-4205, 1979. This book documents the selection of the lunar-orbit rendezvous mission mode (over direct ascent and earth-orbit rendezvous) as well as the history of spacecraft development and the missions through Apollo 11.
- R. C. Hall; *Lunar Impact, A Histo y of Project Ranger.* NASA History Series SP-4210, 1977. Ranger 7 returned the first close-up pictures of the moon after six unsuccessful missions. This book relates the investigations, recriminations and the resulting evolution of the spacecraft.
- Richard Rhodes; *The Making of the Atomic Bomb.* Simon and Schuster, 1988. This fascinating, Pulitzer Prize-winning, account of the development of the atomic bomb presents the theoretical physics, practical engineering and operational planning that made up the World War II Manhattan Project.

Book Reviews

Vital Signs: Using Quality,Time and COST Performance Measurements to Chart your Company's Future

by Steven M. Hronec

Arthur Anderson & Co. • ISBN 0-81 44-5073-3.

Reviewed by Ginny Lentz

Do you know your "Vital Signs?" Are you well on your way to an organizational maturity of Level 3, Managed? Do you have in place the mechanics to get to Level 5, Optimizing? You can validate your plan or put one in place with some help from this book.

The book is about understanding your corporate goals and translating them into measures and metrics that can be used to quantify attainment of those goals and move the corporation into a position of continuous improvement, optimizing, or as Hronec calls it "Quantum Performance."

The book lays out the Quantum Performance model, a matrix that addresses the organization, people, and processes, and then expands into the time honored measures of quality, cost and time.

Remember how we all argued about which process diagramming technique was best? Hronec says you probably need more than one: flow charts work within a discipline, and workflows are needed across the organization and affinity diagrams and interrelationship digraphs are needed to analyze relationships and bottlenecks. We need to understand the dynamic relationships in addition to the static ones. Once documented, the processes can be simplified and bottlenecks identified and relieved. (One suggested measure is the number of steps in a process.)

Do you have management Awareness, Buy-in and Ownership? Hornec shares another matrix to help you determine the difference.

Another point made by Hronec is that we need to understand the process for the receipt of customer request to satisfaction of that request — not simply the processes within one or two disciplines. We need short processes that can be readily modified.

Hronec also helps you make the case for communication of and training for changes as well as having people working within a process determining what to measure. Two key measurements include whether the people performing within a process are the right people and whether they have the necessary skills?

One of the nice things about this book are the references to other sources that are used throughout the book. A key one is the "Memory Jogger" series by GOAL/QPC — A Pocket Guide of Tools for Continuous Improvement and Effective Planning.

The Ghost of the Executed Engineer:Technology and the Fall of the Soviet Union

Graham, Loren R.

Harvard University Press, Cam bridge, 1993.

Reviewed by A. Terry Bahill

One of the first Systems Engineers was an early twentieth century Russian named Peter Palchinsky. He resolutely advocated that engineers be responsible for the big picture. Contrary to the Russian engineers' traditional role of solving the technical problems presented to them by higher authorities, Palchinsky wrote in 1926 that engineers should provide active economic and industrial planning, suggesting where economic development should occur and what form it should take. For example, he thought that engineers asked to design a large hydroelectric dam on a certain river should ask:

- Is the purpose to obtain electricity?
- Is that the best river to dam?
- Is a dam the best way to obtain electricity?
- What are the trade-offs among the alternative generating techniques?
- Is coal available locally?
- If so, might a thermoelectric plant be a better choice?

Answering such questions depends on analyzing local factors and evaluating the economic, social and environmental effects of each. In 1929 Peter Palchinsky was executed for his views on engineering. Afterwards, the education of Russian engineers became very narrow. In 1960, outside Moscow, Loren Graham met a young Russian engineer.

"What kind of an engineer are you?" he asked.

"A ball-bearing engineer for paper mills," she replied.

He responded, "Oh, you must be a mechanical engineer."

"No," she rejoined, "I am a ball-bearing engineer for paper mills. "

Incredulously he countered, "Surely you do not have a degree in ball-bearings for paper mills."

She assured him that she did indeed have such a degree.

The rulers of the USSR also had narrow educational backgrounds. Between 1956 and 1986, the percentage of Politburo members with degrees in technical areas rose from 59 to 89 percent. Graham suggests that this narrowness of education had a lot to do with the disintegration of the USSR.

Out of Control; The Rise of Neo-Biological Civilization

Kevin Kelly

Reading, MA: Addison-Wesley Publishing Co., 1994

Reviewed by Joe Podolsky

Kevin Kelly is a journalist, someone who intelligently observes and communicates. He is currently editor of Wired magazine, which is kind of the trumpet and cymbals of the Silicon Valley publishing orchestra. His observations have motivated him to write an equally noisy book, a dense, meandering production that calls into question much of what we now cherish as leadership and management. He says that our technical and social children have become too big to control. Successful complex things can not be built; they must be grown.

Kelly's basic thesis is that "more is different," and we will inevitably fail when we try to solve big problems using the techniques that worked on small ones. He says that the best way of dealing with large, complex systems, whether technical, social, or biological, is to let go of them, to let them grow in an evolutionary manner rather than indulging in the hubris that we have the knowledge and foresight to plan and engineer them. His model is the "swarm" or the "network," and he describes the rules he sees for adapting to this reality.

Kelly offers a simple/not easy formula for developing complex systems:

1. Do simple things first
2. Learn to do them flawlessly
3. Add layers of activity over the results of the simple task
4. Don't change the simple things that are already working
5. Make the new layer work as flawlessly as the simple
6. Repeat as needed

Every engineering bone in my body screams in protest. Think of the rats-nests of inefficiency I'm going to bury in those layers. Think of the patches, the unused code, the go-to's. Yuk!

All for the sake of having something that does productive work soon and that is always returning benefits even while environments are changing. Hmm... I may hate it, but my business users are going to love it.

I think I'm smart enough to plan for future changes, along with my very smart users. I want to give my user managers control over their processes. But I've never seen a really large project work right the first time, even my own. Some famous ones, like the Denver airport, become fiascoes and revenue faucets for liability lawyers. Others, like the Panama Canal or the more recent English/French Chunnel burn out generations of financiers, politicians, and engineers before they learn enough to get the task done.

Kelly spends most of the book talking about the role of two kinds of evolution, the Darwinian survival of the fittest, and the earlier discredited ideas of Jean-Baptiste Lamarck who wrote about the effects of life on the environment and vice versa, effects some people now call "learning." Kelly feels that Darwinian evolution of species through adaptable mutations is okay for long (reengineering) cycles, but Lamarckian ideas of evolution need to be applied for what we in the quality world call "continuous improvement." Kelly (and Darwin) admit that the theory of evolution in any form still has its blind spots, since we still have no good theory to explain the appearance in biology of sophisticated "subassemblies" such as eyes.

Kelly's excursion finally arrives at Chapter 24, "The Nine Laws of God." The first, topic sentence of the chapter summarizes the book: "Out of nothing, nature makes something." And here are the nine laws nature follows to do that great kick:

- Distribute being. Use hive, swarm, and network organizations rather than hierarchies.
- Control from the bottom up. Overall governance must arise from the most humble interdependent acts done locally in parallel, not from a central command.
- Cultivate increasing returns. Use skills; strengthen them; use them again. Use positive feedback. Confidence builds confidence.
- Grow by chunking. Begin with a simple system that works. Take time to let each part test itself against others. Create complexity by assembling it incrementally from simple modules that can operate independently.
- Maximize the fringes. Look in the hidden corners, the moments of chaos, the isolated clusters for the hints of future innovations.
- Honor your errors. Learn from them. Evolution can be described as systematic error management.
- Pursue no optima; have multiple goals. Rather than striving to optimize any one (much less several) functions, complex systems survive only making lots of functions work just "good enough."
- Seek persistent disequilibrium. Operate at the edge of stability. Think like a skier. Standing still is just as bad as a tumbling fall.
- Change changes itself. Complex systems are kept alive by adapting, by having mechanisms to deal with change and to go one level higher, to change how changes are made.

So where does all this leave us? We're in big, complex companies. We're awash with tough, rapid changes. Our old successful processes aren't working. They don't scale up. One famous definition of insanity is doing the same things over and over and expecting different results. We

need a new way of looking at things, a new paradigm. Is evolutionary methodology an answer or a cop-out?

I'm not sure that it's the answer, but it can't hurt. Getting small, early successes is sure better than having large, long failures. Someday, we may find a way of doing large, complex projects right the first time. But until we do, evolution sounds pretty good to me.

Joe Podolsky is Manager of Planning and Quality for HP's Corporate Information Systems department. In his 20 years at HP, he has been an IT manager in several divisions and the controller of a division. He has also spent a number of years as a quality manager a the corporate level. Joe can be reached at podolsky@corp.hp.com.

Fuzzy Rule-based Modeling with Application to Geophysical, Biological and Engineering Systems

by Andras Bardossy and Lucien Duckstein

CRC Press, 1995 232 pages ISBN O-8493-7833-8

Reviewed by James A. Sanchez, Communications Committee, JSanchez7@msmail4.hac.com

This book is actually a monograph that provides an interdisciplinary framework to model complex systems using what has commonly been refered to as "fuzzy logic." The authors have taken a difficult subject and have produced a good introduction to fuzzy logic, easily understood by engineers. Rudimentary knowledge of set theory and an affinity for mathematics is advised. The examples used in the book cross many different fields of application making it fun reading for those of us pigeon-holed in a narrow field of every day work.

The book is well organized into ten chapters beginning with basic elements and definitions, then on to fuzzy rules, systems and construction. Modeling versus control is discussed, then applications using numerous examples from the fields of weather forecasting, water resources, train operation, and medical diagnosis.

Unfortunately, the book contains numerous grammatical, typographical, syntactic, graphic and mathematical errors which makes the subject matter difficult to understand. Though the errors are not insurmountable, this is not a book that the uninitiated, such as myself, can easily peruse. I could not find errors in the definitions and propositions (I knew almost nothing of fuzzy logic until I read this book), but the non-obvious errors in the examples, tables and graphics left me skeptical of some of the conclusions. It took me far longer than I had anticipated to read the 232 pages.

Still, I recommend this book to system engineers who want to learn about fuzzy logic at a working level instead of a sales pitch from some "techie" who wants to try something new. After reading this book I feel that I have a base from which to actually decide if an application can make use of fuzzy logic, and then proceed to design and implement for the application.

About INCOSE

INCOSE is a 2000+ member professional organization of systems engineers and others interested in systems engineering. The purpose of INCOSE is to foster the definition, understanding, and practice of World Class Systems Engineering in industry, academia, and government. Members come from the United States and at least ten other countries. Over twenty local chapters across the United States are joined by chapters and emerging chapters in the UK, Europe, and Canada, and an affiliated organization in Australia. The INCOSE board of directors consists of six elected officers (a president, past president, president-elect, and secretary, treasurer, and director-at-large), ten regional directors from the five US regions, one at-large director, and two representatives of the Corporate Advisory Board. Nineteen companies support the organization as Corporate Advisory Board members, sending representatives, an initial donation, and yearly sustaining donations.

If you are interested in INCOSE membership, contact our central office; the address is given below.

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This publication is a product of the Communications Committee, part of the International Council on Systems Engineering (INCOSE).

Editor: Valerie Gundrum. Contributing editors include Shirley Bishop, Beth Clark, Pat Hale, Dona Lee, Lew Lee, James Sanchez, Sarah Sheard, Bill Schoening.

INSIGHT is published four times per year in March, June, September, and December. Inputs for the June issue are due May 17. For email articles, please specify the subject line as: Input for INSIGHT. Direct your inputs and inquiries as follows:

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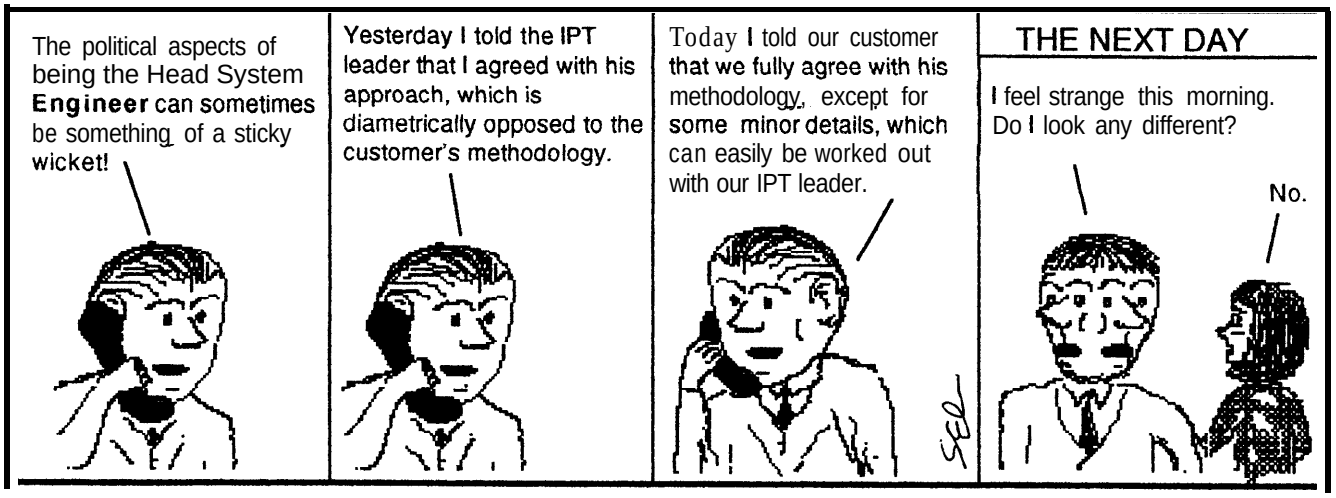

Do you have ideas for Stan's next cartoon? Contact him at (301) 231-2094 or by email at longse@vitro.com

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